

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application

1-57 (Canceled)

58. (New) An optical labeling molecule for labeling a target analyte comprising:

(a) a zwitterionic dye moiety comprising at least one positive or at least one negative charge moiety added to obtain a net neutral charge, wherein the said positive charge moiety is selected from a group consisting of a quarternary ammonium group, a guanidinium group and a positive charge group, wherein said positive charge moiety is not titratable between the pH of 3-12, and wherein the negative charge moiety is selected from the group consisting of a sulfonate group and a sulfate group, wherein the negative charge moiety is not titratable between the pH of 3-12;

(b) a functional linker moiety; and

(c) a titratable group moiety wherein the said titratable group closely approximates the pK of the group removed from the analyte by reaction with the functional linker.

59. (New) The optical labeling molecule of claim 58, wherein the zwitterionic dye moiety comprises a chromophore responsible for a detectable optical signal.

60. (New) The optical labeling molecule of claim 58, wherein the said positive and said negative charge moieties are added to a neutral dye or a charged dye.

61. (New) The optical labeling molecule of claim 58, wherein the said titratable group moiety is a tertiary amine.

62. (New) The optical labeling molecule of claim 58, wherein the zwitterionic dye moiety comprises at least one quarternary ammonium group and at least one sulfonate group.

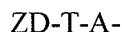
63. (New) The optical labeling molecule of claim 58, wherein the zwitterionic dye moiety comprises at least two quarternary ammonium groups or at least two guanidinium groups and at least two sulfonate groups.
64. (New) The optical labeling molecule of claim 58, further comprising a cleavable moiety selected from a group consisting of a chemical moiety, a photocleavable moiety and an enzymatically cleavable moiety.
65. (New) The optical labeling molecule of claim 61, wherein the photocleavable moiety is selected from a group consisting of an O-nitrobenzylic compound, a benzoin moiety, and a nitrophenylcarbamate ester.
66. (New) The optical labeling molecule of claim 58, further comprising a second label, wherein the second label comprises a light stable isotope or a heavy stable isotope.
67. (New) The optical labeling molecule of claim 58, wherein the linker moiety is an amino group reactive linker selected from the group consisting of an imidoester, a N-hydroxysuccinimidyl ester, an isothiocyanate, a sulfosuccinimidyl group, an aldehyde, and a sulfonylchloride-reactive linker and a sulfhydryl-reactive linker.
68. (New) The optical labeling molecule of claim 66, wherein the sulfhydryl-reactive linker is selected from the group consisting of a maleimide, an iodoacetamide, an alkyl bromide and a benzoxidiazole.
69. (New) The optical labeling molecule of claim 58, wherein the dye moiety comprises boron difluoride diaza-indacene-propionic acid (BODIPY) further comprising at least one added negative charge moiety selected from a sulfonate group or a sulfate group and at least one added positive charge moiety selected from a group consisting of a quarternary ammonium group, a guanidinium group and a positive charge group.

70. (New) The optical labeling molecule of claim 58, wherein the labeling molecule has the general structure:



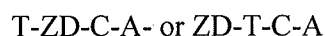
wherein ZD is the zwitterionic dye moiety, T is the titratable moiety, and A is the linker moiety.

71. (New) The optical labeling molecule of claim 58, wherein the labeling molecule has the general structure:



wherein ZD is the zwitterionic dye moiety, T is the titratable moiety, and A is the linker moiety.

72. (New) The optical labeling molecule of claim 58, wherein the labeling molecule has the general structure:



wherein ZD is the zwitterionic dye moiety, T is the titratable moiety, C is the cleavable moiety, and A is the linker moiety.

73. (New) The optical labeling molecule of claim 58, wherein the labeling molecule has the general structure:



wherein ZD is the zwitterionic dye moiety, T is the titratable moiety, C is the cleavable moiety, I is the stable isotope moiety, and A is the linker moiety.

74. (New) The optical labeling molecule of claim 58, wherein the labeling molecule has the general structure:



wherein ZD is the zwitterionic dye moiety, T is the titratable moiety, C is the cleavable moiety, I is the stable isotope moiety, and A is the linker moiety.

75. (New) The optical labeling molecule of claim 58 comprising:

(a) a difluoride diaza-indacene-propionic acid (BODIPY) dye moiety, having at least one quarternary ammonium group and at least one sulfonate group, wherein said charged moieties are non-titratable between the pH of 3-12;

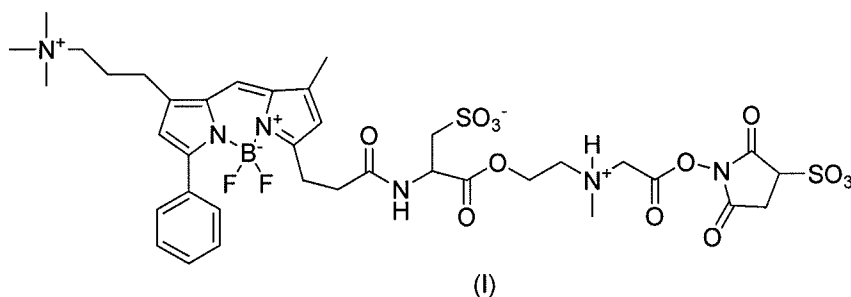
(b) a titratable group moiety wherein the said titratable group is a tertiary amine;
and

(c) a functional linker moiety wherein such linker is a N-hydroxysuccinimidyl ester.

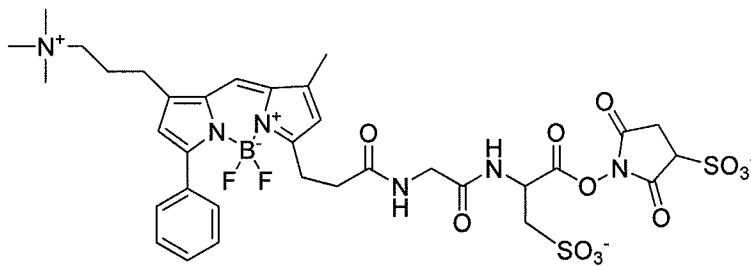
76. (New) The optical labeling molecule of claim 74, further comprising:

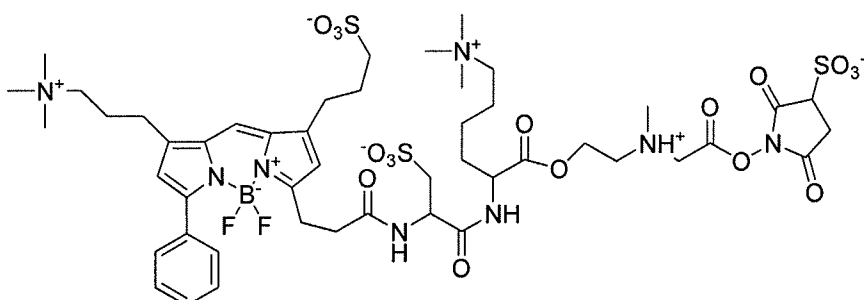
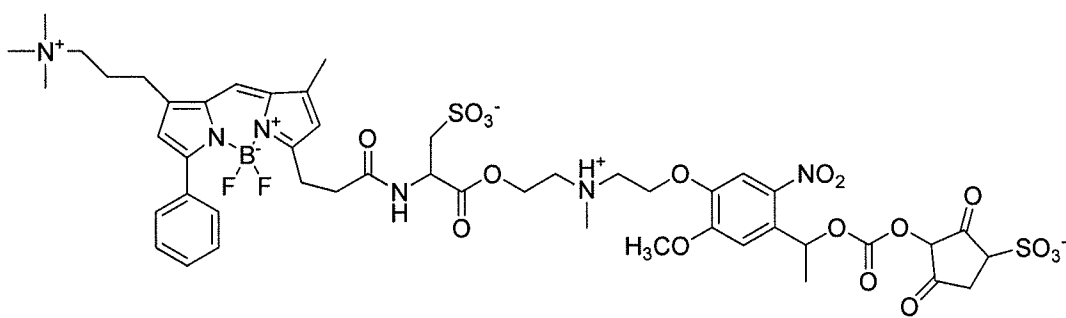
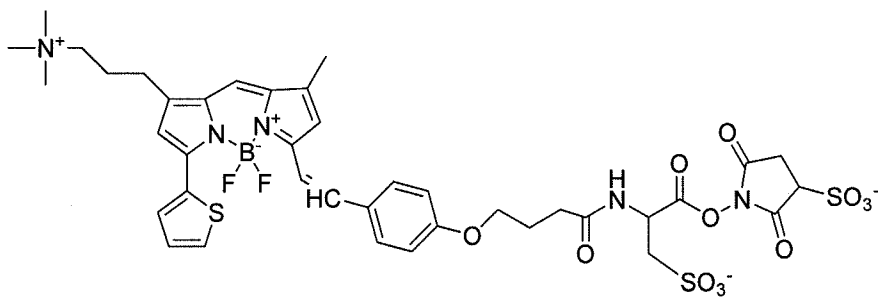
(d) a photocleavable moiety wherein such photocleavable moiety is an O-nitrobenzylic compound.

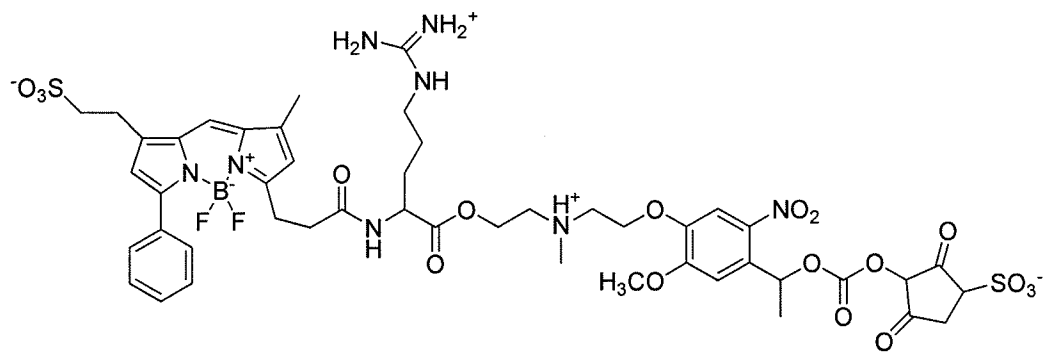
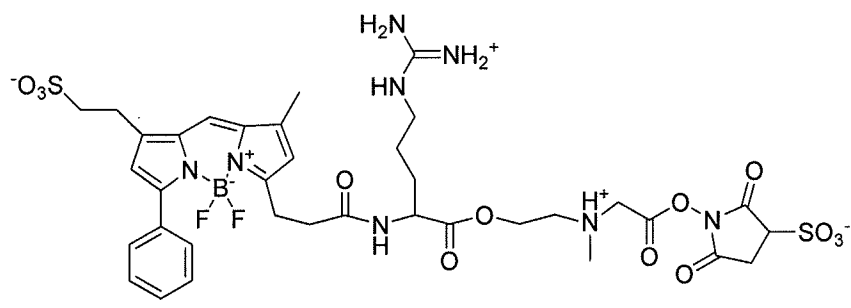
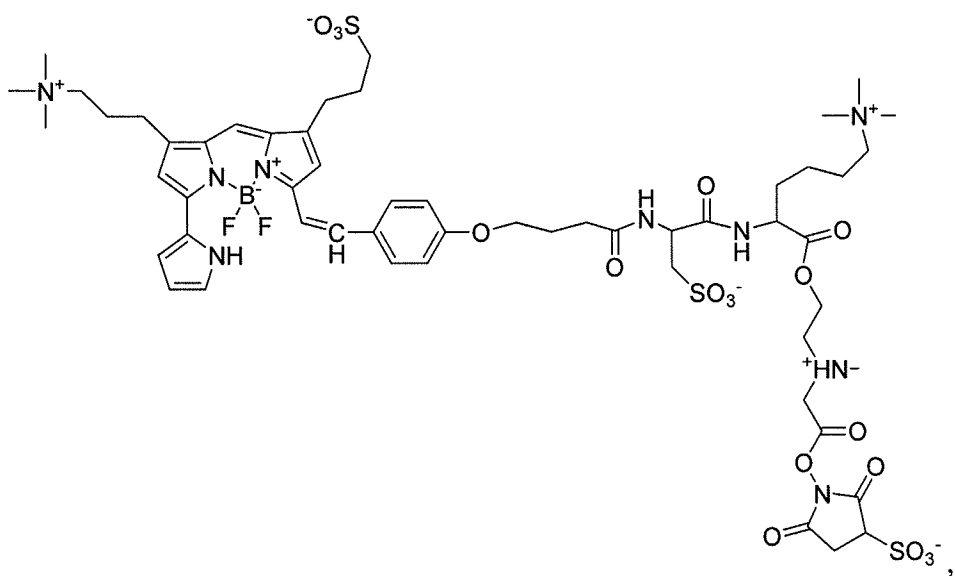
77. (New) The optical labeling molecule of claim 58 having formula (I):

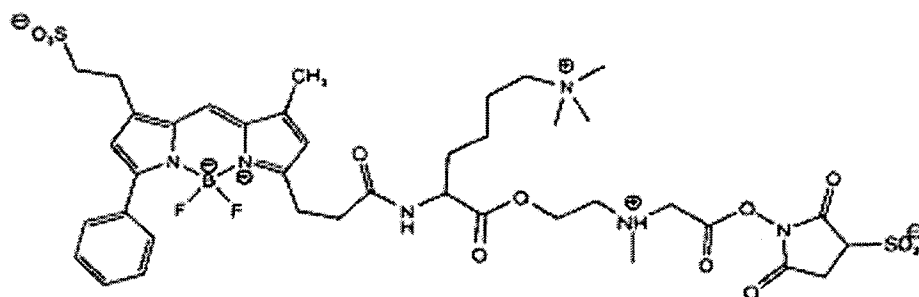
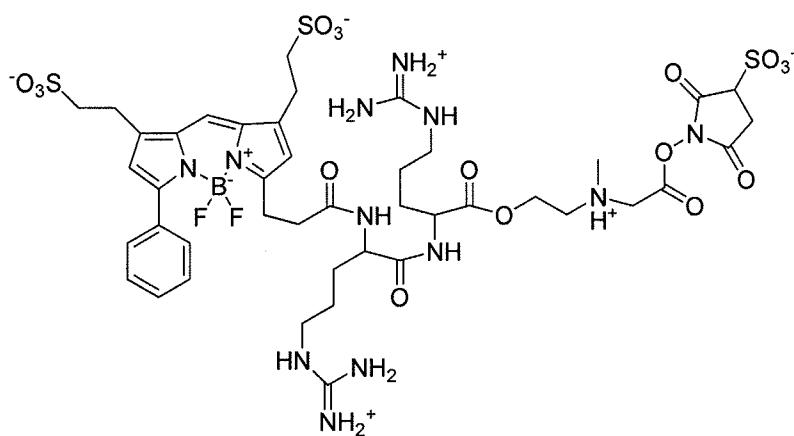
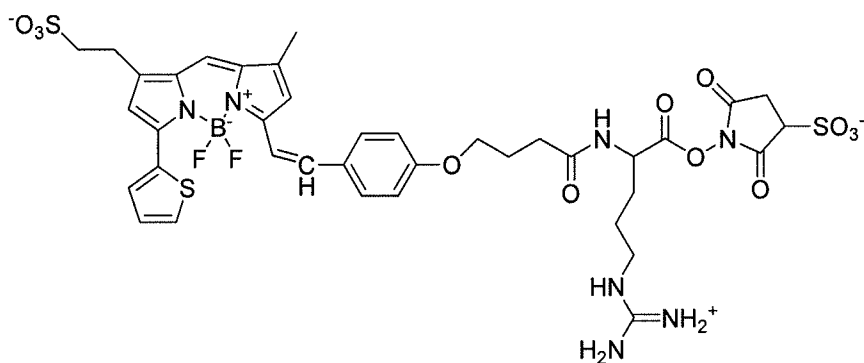


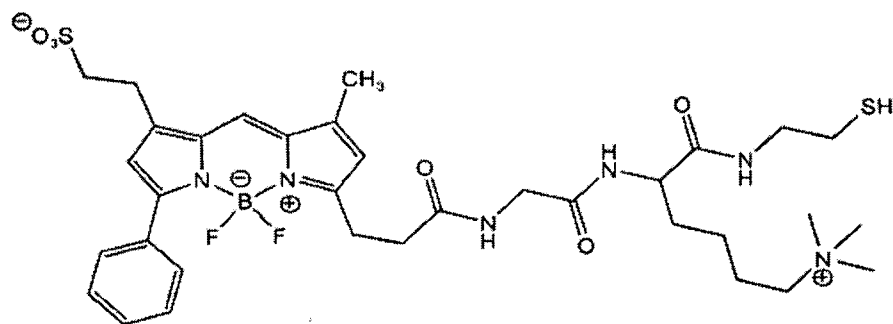
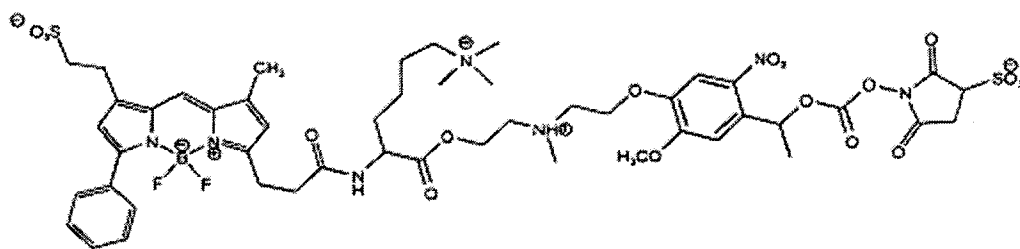
78. (New) The optical labeling molecule of claim 58 which is selected from the group consisting of:



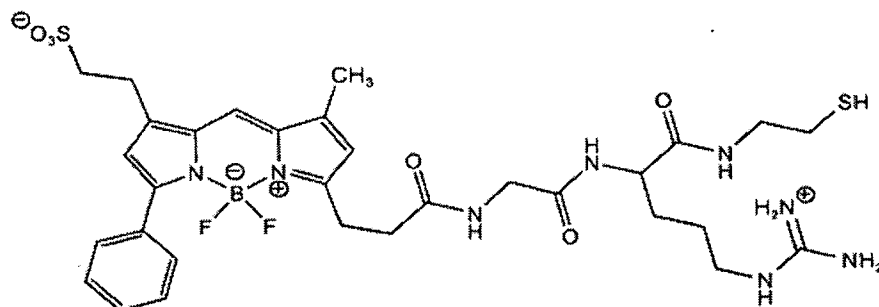








, and



79. (New) A cellular component selected from the group consisting of proteins, carbohydrates, lipids, and nucleic acids covalently attached to the optical labeling molecule of claim 58.
80. (New) The cellular component of claim 79, wherein the said component is a protein.
81. (New) The cellular component of claim 79, wherein the said component is a carbohydrate.
82. (New) The optical labeling molecule of claim 58, prepared by
- (a) providing a dye moiety comprising one or more positive or one or more negative charge moieties;
 - (b) adding at least one positive charge moiety selected from the group consisting of a quarternary ammonium group, a guanidinium group and a positive charge group, wherein the positive charge moiety is not titratable between the pH of 3-12, or at least one negative charge moiety selected from a group consisting of a sulfonate group and a sulfate group, wherein the negative charge group is not titratable between the pH of 3-12 to form a zwitterionic dye moiety;
 - (c) contacting the zwitterionic dye moiety with a titratable group moiety; and
 - (b) contacting the product from step (c) with a functional linker moiety to provide a optical labeling molecule comprising a zwitterionic dye moiety characterized by a net neutral charge.
83. (New) The optical labeling molecule of claim 82, wherein the zwitterionic dye moiety is a fluorescent dye.